**United States**

PROPOSALS FOR THE WORK OF THE CONFERENCE

# Agenda item 1.2

**Agenda Item 1.2***:**to consider in-band power limits for earth stations operating in the mobile-satellite service, meteorological-satellite service, and Earth exploration-satellite service in the frequency bands 401-403 MHz and 399.9-400.05 MHz, in accordance with Resolution* ***765 (WRC-15)***

**BACKGROUND**: Resolution **765 (WRC-15)** resolves to invite the WRC-19 to take into account the results of ITU-R studies and consider the possibility of establishing in-band power limits for Earth stations in the Earth exploration-satellite service (EESS) and meteorological-satellite service (MetSat) in the frequency bands 401- 403 MHz and in the mobile-satellite service (MSS) frequency band 399.9-400.05 MHz.

Earth stations operating in the EESS and MetSat in the frequency band 401-403 MHz and in the MSS in the frequency band 399.9-400.05 MHz are used for data collection systems (DCS) uplinks. These DCS usually operate most efficiently together by using moderate to low equivalent isotropic radiated power (e.i.r.p) levels, resulting in small link margins.

Recommendation ITU-R SA.2045 provides information on the performance and interference criteria for relevant geostationary-satellite orbit (GSO) and non-geostationary satellite (non-GSO) DCS in the frequency band 401-403 MHz. Recommendation ITU-R SA.2044 provides information on the current and future usage of non-GSO DCS in the frequency band 401-403 MHz and the portioning of the frequency band to allow all DCS equal access to the spectrum. Recommendation ITU-R M.2046 provides a description, and the corresponding protection criteria for broadband noise and narrowband interference, of one MSS system that uses the frequency band 399.9-400.05 MHz (Earth-to-space).

DCS stations are deployed worldwide and communicate with GSO and non-GSO satellites are deployed worldwide for the purpose of collecting essential weather and climate data. The Data Collection Platforms (DCP) gather information activity related to the Earth, environmental and scientific applications, weather, environment observation: meteorological and oceanographic, seismic observation, volcanology, geodesy and geodynamics, fishing vessel monitoring, wildlife tracking, homeland security, law enforcement, test/evaluation, monitoring shipments of dangerous goods, humanitarian applications, managing water resources or tsunami warning system. The data collected by DCPs are transmitted to satellites that relay the retrieved information to dedicated earth stations. EESS, MetSat, and MSS systems are necessary for monitoring and predicting climate change and monitoring oceans, weather, and water resources.

There is a growing interest in using these frequency bands for critical satellite telecommand purposes under the EESS, MetSat, and MSS allocations. The output power levels of these Earth stations at the antenna port for telecommand links (Earth-to-space) may be much higher than the typical moderate to low power levels traditionally used for the operation of EESS, MetSat, and MSS DCS systems in the frequency bands 401-403 MHz and 399.9-400.05 MHz.

ITU-R studies are considering (i) in-band power limits for earth stations operating in the frequency ranges 399.9-400.05 MHz in the MSS and 401-403 MHz in the EESS and MetSat services and (ii) potential mitigation measures that, if employed, would allow some satellite telecommand operations to continue indefinitely in both frequency bands.

Proposal:

ARTICLE 5

**Frequency allocations**

**Section IV – Table of Frequency Allocations**

(See No. **2.1**)

**MOD**  **USA/AI 1.2/1**

|  |  |  |
| --- | --- | --- |
| 335.4-410 MHz | | |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 399.9-400.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 ADD 5.A102 | | |
| 400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL- SATELLITE (400.1 MHz)  5.261 5.262 | | |
| 400.15-401 METEOROLOGICAL AIDS  METEOROLOGICAL-SATELLITE (space-to-Earth)  MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209  SPACE RESEARCH (space-to-Earth) 5.263  Space operation (space-to-Earth)  5.262 5.264 | | |
| 401-402 METEOROLOGICAL AIDS  SPACE OPERATION (space-to-Earth)  EARTH EXPLORATION-SATELLITE (Earth-to-space) ADD 5.B102  5.C102 5.D102  METEOROLOGICAL-SATELLITE (Earth-to-space) ADD 5.B102  5.C102 5.D102  Fixed  Mobile except aeronautical mobile | | |
| 402-403 METEOROLOGICAL AIDS  EARTH EXPLORATION-SATELLITE (Earth-to-space) ADD 5.B102  5.C102 5.D102  METEOROLOGICAL-SATELLITE (Earth-to-space) ADD 5.B102  5.C102 5.D102  Fixed  Mobile except aeronautical mobile | | |

**Reasons:** Studies have shown that to protect the existing and future operation of DCS in the MSS, EESS, and MetSat services new regulatory provisions are needed to address (i) in-band power limits applicable to Earth stations and (ii) mitigation measures that will allow some satellite telecommand operations continue indefinitely.

**ADD**  **USA/AI 1.2/2**

5.A102 In the frequency band 399.9-400.03 MHz, the maximum e.i.r.p. transmission at the input of the antenna from any Earth stations (Earth-to-space) in the mobile-satellite service shall not exceed 5 dBW. This limit shall apply after 22 November 2024 for which complete notification information is received by the Radiocommunication Bureau before 22 November 2019. Administrations are encouraged to take all efforts to comply with the maximum e.i.r.p limit in the frequency band 399.9-400.03 MHz prior to 22 November 2024.

**Reason:** Establishes Earth station maximum e.i.r.p. limit to ensure the continued operations of non-GSO data collection systems in the frequency band and permits continued satellite telecommand operations in the 400.03-400.05 MHz segment of the band while protecting DCS.

**ADD**  **USA/AI 1.2/3**

5.B102 In the frequency band 401-403 MHz, the maximum e.i.r.p. transmission at the input of the antenna from any Earth stations (Earth-to-space) in themeteorological-satellite service and the Earth exploration-satellite service shall not exceed 22 dBW for geostationary-satellite orbit systems and non-geostationary-satellite orbit systems with an orbital apogee equal to or greater than 35 786 km and 7 dBW for non-geostationary-satellite orbit systems with an orbital apogee lower than 35 786 km.

After 22 November 2024, these limits shall apply to all systems, except telecommand systems for which complete notification information has been received by the Radiocommunication Bureau before 22 November 2019 and brought into use before 22 November 2019, in the meteorological-satellite service and the Earth exploration-satellite service operating in this frequency band.

Administrations are encouraged to take all efforts to comply with the maximum e.i.r.p limits in the frequency band 401-403 MHz prior to 22 November 2024.

**Reasons:** Establishes Earth station maximum e.i.r.p. limit to ensure the continued operations of DCS in the frequency band and permits some continued satellite telecommand in the frequency band while protecting DCS.

**ADD**  **USA/AI 1.2/4**

5.C102 Operations for telecommand in the band 401-403 MHz after 22 November 2024 shall comply with DRAFT NEW RESOLUTION [TBD] (WRC-19).     (WRC‑19)

**Reason:** Provides a new WRC Resolution that would permit some continued satellite telecommand operations in the frequency band while protecting DCS.

ADD USA/AI 1.2/5

5.D102 In the frequency band 401.898-402.522 MHz, the maximum e.i.r.p. transmission at the input of the antenna from Earth stations (Earth-to-space)of associated satellite system for which complete notification information was received by the Radiocommunication Bureau on 28 April 2007 may continue to be used at that permitted level.

**Reasons:** This provision provides flexibility to existing Earth station(s) of the associated non-GSO system, and it ensures the continued operation of this non-GSO DCS.

**ADD**

DRAFT NEW RESOLUTION [TBD] (WRC-19)

**Transitional measures for existing satellite networks and systems of the meteorological-satellite service (Earth-to-space) and the Earth exploration-satellite service (Earth-to-space) in the**

**frequency band 401-403 MHz**

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

*considering*

1. that data collection systems (DCS) operate on geostationary and non-geostationary orbits in the meteorological-satellite service (MetSat) and the Earth exploration-satellite service (EESS) (Earth-to-space) systems in the frequency band 401-403 MHz;
2. that DCS are essential for monitoring and predicting climate change, monitoring oceans, and water resources, weather forecasting and assisting in protecting biodiversity and improving maritime security;
3. that the frequency band 401-403 MHz is also used for the uplink of critical mission and telemetry data for meteorological and Earth exploration purposes;
4. that the World Radiocommunication Conference 2019 (WRC-19) has created a 7 dBW eirp limit for all systems in the frequency band 401-403 MHz after 22 November 2024 in No. **5.B102** to provide protection of existing and future DCS;

*noting*

1. that several EESS and MetSat satellite networks and systems in the frequency band 401-403 MHz were notified and brought into use before 22 November 2019;
2. that some of these EESS and MetSat satellite networks and systems, completing operations in *considering c)*, above may not meet the eirp limit in *considering d)*;

*resolves*

that the frequency assignment of MetSat (Earth-to-space) and EESS (Earth-to-space) satellite network in the frequency band 401-403 MHz for which complete notification information was received by the Radiocommunication Bureau prior to the end of WRC-19 and which space stations do not meet the eirp limits stated in No. **5.B102** shall be used on a primary basis with respect to the DCS after 22 November 2024 as stipulated in the Annex to this Resolution;

*instructs the Director of the Radiocommunication Bureau*

for the frequency assignment of MetSat (Earth-to-space) and EESS (Earth-to-space) satellite network for which complete notification information was received by the Radiocommunication Bureau prior to the end of WRC-19, the Bureau shall review the finding under No. **11.50** without proposal to the administration that it submit a new assignment to replace the previous one. The original date of such assignment in the Master International Frequency Register (MIFR) shall be kept.

ANNEX TO draft new   
RESOLUTION [TBD] (WRC-19)

**Transitional measures for existing satellite networks and systems of the meteorological-satellite service (Earth-to-space) and the Earth exploration-satellite service (Earth-to-space) in the**

**frequency band 401-403 MHz**

1 EESS and MetSat satellite networks and systems, falling under *noting b)*, shall implement the following mitigation measures to maintain operations after 22 November 2024.

2 EESS and MetSat satellite networks and systems, falling under *noting b)*, shall only operate in the GSO-only DCS segments of the frequency band 401-403 MHz as outlined in Recommendation ITU-R SA.2045. These segments are 401.2-401.3 MHz, 401.7-401.899 MHz, and 402.067-402.850 MHz.

3 EESS and MetSat satellite networks and systems, falling under *noting b)*, shall employ earth stations with antenna patterns with relative antenna gain pattern masks that achieve compliance with Recommendation ITU-R SA.1163. The earth stations shall avoid pointing at GSO DCS satellites sufficient for the antenna off-axis loss to reduce levels into the GSO DCS receivers to meet the relevant ITU-R thresholds for interference exceedance in Recommendation ITU-R SA.1163. Example antenna patterns are referenced in Figures 4 and 5 in Report ITU-R SA.2430.

**Reasons:** Allows continuation of some satellite telecommand operations in the EESS and MetSat frequency bands, with protection to all DCP operations, after 22 November 2024.

SUP USA/AI 1.2/6

RESOLUTION 765 (WRC-15)

Establishment of in-band power limits for earth stations operating

in mobile-satellite service, the meteorological-satellite service and

the Earth exploration-satellite service in the frequency bands

401-403 MHz and 399.9-400.05 MHz

# Reasons: Consequential actions to establishing in-band power limits for Earth stations operating in the mobile-satellite service, the meteorological-satellite service and the Earth-exploration-satellite service in the frequency bands 399.9-400.05 MHz and 401-403 MHz.

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